

WS420 Elevator Emergency Power Device

USER MANUAL

Shanghai Wenshang Innovative Technology Co., Ltd.

Notice

- ☆ Dear customer, at the outset we want to thank you for choosing our company's product! To help you install and use the product correctly, as well as to guarantee the safety of elevator equipment and this product, please carefully read this *User's Manual* before you start to install and commission this product.
- ☆ Please carefully check the model number and parameters (provided by the buyer on purchasing) on the nameplate, which is pasted on the rear panel of this ARD's host machine, as well as the same contents of the elevator. If any mismatch is found, please do not install this device, let alone power on it to test. Please contact the service department of our company immediately and discuss with our service staff for a solution. The service telephone numbers are: **021-64802098/13/16/17, 64802658**
High voltage exists in the cabinet. If the cover is opened for debugging, please do not touch the high-voltage part.
- ★ Six months after the production date, if the product has not been put into normal operation yet (e.g. the box is not opened or although the product is installed and debugged but the elevator is not started for using), please be sure to charge the storage battery as the following method:
Open the rear cover of the ARD's host machine, take out power wires and cables, and connect them tightly with the corresponding terminals on the battery box (0V, 24V, 48V), and then connect the device to 3-phase 380v power supply line (L1/L2/L3) and zero line (N), switch the power switch on the front panel of the device to the ON position, charge the battery for 24 hours.
- ☆ We keep the right to improve and modify the product and this user's manual. The user's manual is subject to change without notice.

Content

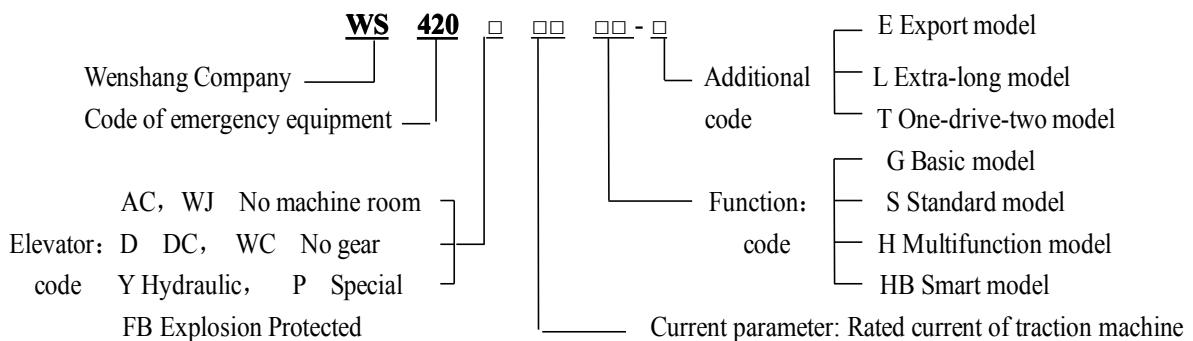
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Summarization

1. Summary

WS420 series of elevator Emergency Power Device (EPD) or Automatic Rescue Device (ARD), (**The follows are abbreviated as ARD**) are a same type of safety equipment aiming at the emergent stop of the elevator which is caused by power failure or power malfunction. In the emergent rescue, the equipment is powered by storage battery. The energy stored in the battery is reversed into the electricity needed by the elevator. The elevator will be started and the cage will be pulled to the near floor, then the car door and landing door will be opened and the passenger can leave safely without being stuck in the elevator. For **H** multifunction type and **HB** smart type, except being used for power failure emergency rescue, they can also provide automatic emergency rescue and play comforting voice to make the passenger not be panicky when malfunction occurs to the electric controlling system of the elevator. The smart type can also automatically call and notify service personnel for any electric or mechanic fault of the elevator.

1) Product model



2) Functions and other requirements

The basic functions and optional requirements of emergency equipment are listed in table 1.

Function Series	Power Failure Emergency	Fault Emergency	Voice Comfort	Wire-less Call	Export	Long distance	Special
G Basic Series	○						
S Standard Series	○				△	△	△
H Multifunction	○	○	○		△	△	△
HB Smart Series	○	○	○	○	△	△	△

Note: “○” means basic function; “△”means optional function for the customer’s choosing

Table 1 Functions of emergency equipment

3) Main technical parameters

- (1) Input voltage: 3Φ380 V (special voltage requirement shall be given a clear indication in the order)
- (2) Storage battery set: 12 V / (12AH - 33 AH) × 4 (the capacity of real equipment is based on the specification of the order)
- (3) The maximum driving power of elevator can be customized: ≤ 70KW (the capacity of real equipment is based on the specification of the order)

4) Working environment

Summarization

- (1) Environment temperature: -0°C to 40°C
- (2) Relative humidity: < 95%, without dew;
- (3) No explosive or corrosive harmful gas or dust exists in the air.

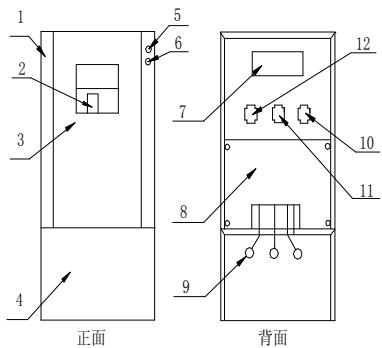
5) Configuration structure

According to the installation method, the emergency equipments are divided into two types: with machine room and without machine room. And the configuration structures of these two types are shown like picture 1A and picture 1B.



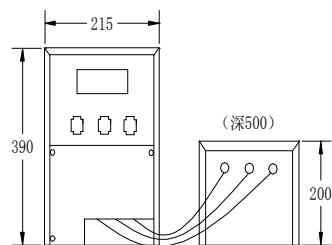
Picture 1A Configuration structure of elevator emergency equipment with machine room

图A 立式整体安装



1. 主机
2. 电源（工作）开关
3. 商标
4. 蓄电池
5. 电源指示灯（红）
6. 应急运行指示灯（绿）

图B 水平分体安装

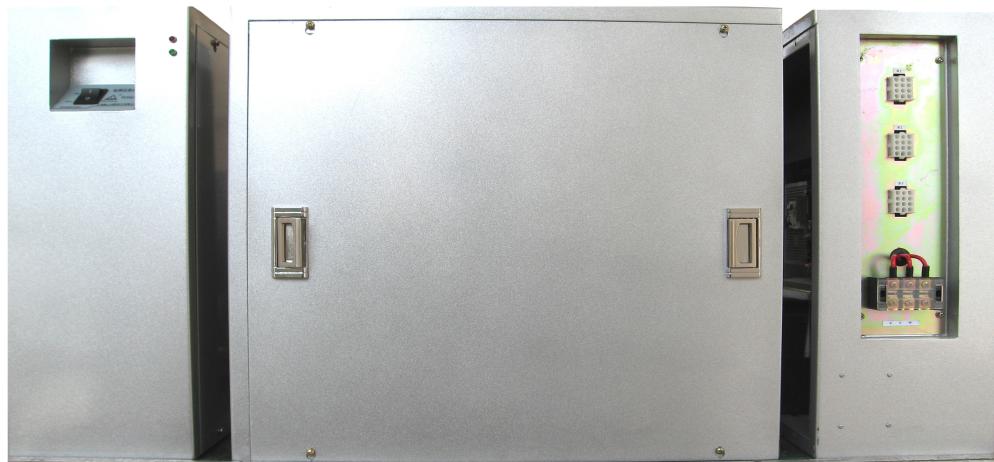


Standing integral installation

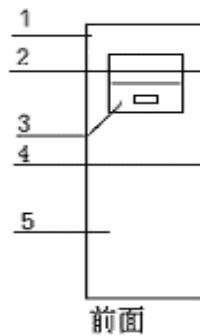
Horizontal split installation

1. Host machine 2. Power (work) switch 3. Label 4. Storage battery 5. Power supply indication lamp (red)
6. Emergent operation indicating lamp (green) 7. Nameplate 8. Cover of conn post (output of storage battery)
10/11/12. Controlling cable socket B1/B2/B3

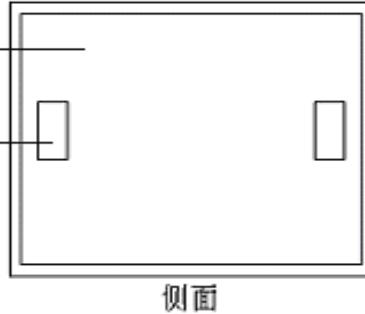
Operation Principle



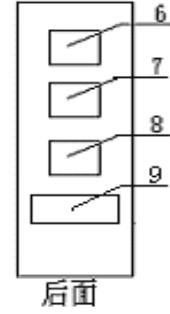
Picture 1B Configuration structure of elevator emergency equipment without machine room



front view



side view

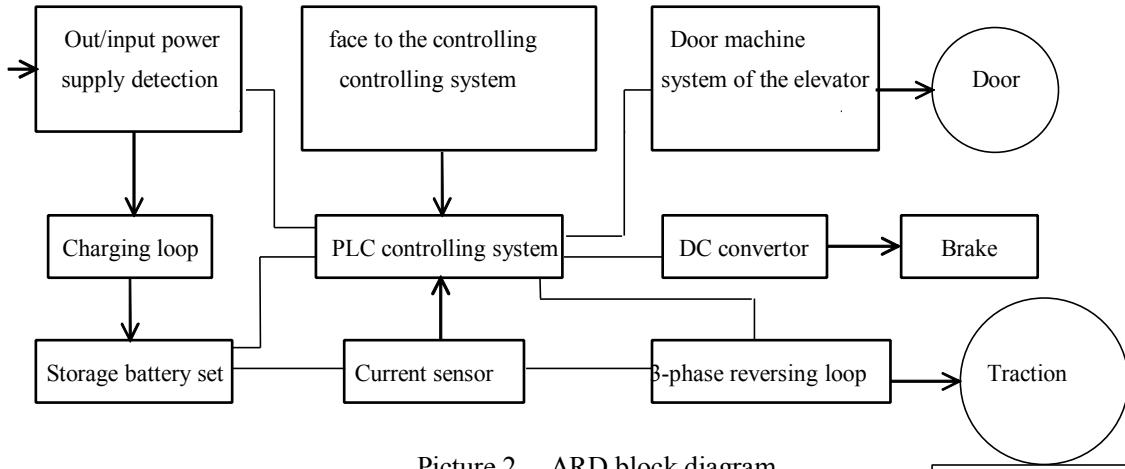


rear view

1. Host machine 2. Cover 3. Power supply switch 4. Handle 5. Panel 6. Socket B1 of controlling

cable 7. Socket B2 of controlling cable 8. Socket B3 of power supply cable 9. Motor output terminal TD

2. Work Principle



Picture 2. ARD block diagram

Operation Principle

1) Power supply detecting

The power supply detecting board of the emergency equipment K11 inspects the status of the input three phase power supply all the time. If the power supply is in normal status, the storage battery set of the equipment is automatically floating charged by charging loop and be kept at the rated work voltage. The charging loop has over-charge, over-current and short-circuit protecting functions. If the power of the loop is off, a power off signal will be sent to the controlling system and the system will make emergent processing.

2) Emergent operation

The controlling system of the ARD will immediately detect the status of the elevator and automatically start the emergent rescue when the elevator runs into a power failure (for type G and S) or a controlling system fault of the elevator (for type H and HB). First the power supply contactor K12 is pulled in, the connection between the R, S, T three-phase controlling power supply and the inputting terminals R0, S0, T0 of the controlling power supply in the elevator's controlling cabinet is shut off by the normally-closed contacts. The normally opened contact of relay K3 closes. Then the safety, lock and overhaul loops of the elevator are detected, and the door area sensor is powered on, the near floor signal is also detected. If the loops are in normal status the converter will be switched on to power on the door machine controlling system. The relay K14 of the ARD is pulled in (see picture 8 for AC door machine, see picture 9 for DC door machine, and see picture 10 for variable frequency door machine), the door-motor MD gets the voltage it needs, and opens the car door and landing door synchronously. If the cage is not at the near floor position, the normally opened contacts of brake relay K7 and K8 close (see picture 11), the DC converter supplies the brake loop to open the brake. The voltage outputted from 3-phase reversing loop goes through K10's normally opened contactor (which is closed now) to power on the traction machine, which pulls the cage to run at a certain direction. The cage moves to the near floor position and stops. The 3-phase reversing voltage stops outputting, the brake closes. After the car door and cage door are opened, the

contacts of contactors and relays of the ARD mentioned above resume to the status before the emergent operation. The connection between 3-phase AC power supply and the controlling system of the elevator is resumed and the emergent operation is ended, the power supply of the ARD is automatically shut off.

3) Safety lock

If the controlling system of the ARD judges the stopping of the elevator is due to the fault of safety loop or door lock loop, the equipment will not start the emergent operation according to the requirements of *Safety Norm* for the operation of elevator. After the emergent operation is started, the ARD still detects the signal from elevator safety loop and door lock loop all the time. Once a protecting signal is generated, the emergent operation is stopped immediately to assure the safety of the passengers and the elevator equipment. At the mean time the ARD is also detecting the overhaul loop of the elevator's controlling system all the time. When the service personnel are examining the elevator, the ARD is automatically locked and will not be put into emergent operation if only the examining switch is pressed down.

4) After the emergent operation

After the emergent operation, the connection between the equipment and the control equipment is shut off and the ARD is at the isolated stand-by status without any affection to the operating of the elevator. The elevator can normally operate if only the power from the 3-phase AC power supply is resumed. The charging loop of the ARD automatically charges the storage battery set again.

Installation and Wiring

3. Installing Connection

The ARD is easy to install. If there is a machine room it can be installed beside the elevator controlling cabinet; if there is not a machine room, it can also be fixed beside the controlling cabinet with the accessory installation rack. Before starting connection the personnel shall first open the shell of the ARD's host machine and take out the controlling cables and relays, as well as other accessories. The general connection between the ARD and the controlling system of the elevator is shown in picture 5.

This user's manual is a unified general version to match all types of elevators produced inside/outside China instead of a special version for a certain elevator. When you get this manual, please do not be hurry to connect those wires. We suggest you carefully compare the drawings in this manual with corresponding drawings of the elevator's controlling system, find out the corresponding signal or terminal numbers needed for connecting with the ARD on the drawings and make marks. A signal-comparison-table (for signals related with the ARD and the elevator's controlling cabinet) is strongly recommended for the using of connection. If other drawings or supplementary text illustrations are appended to the manual, it is due to the special requirements of your elevator. Please take these appended drawings and supplementary text illustrations as the criterion for installation and debugging.

1) Connection of main power supply

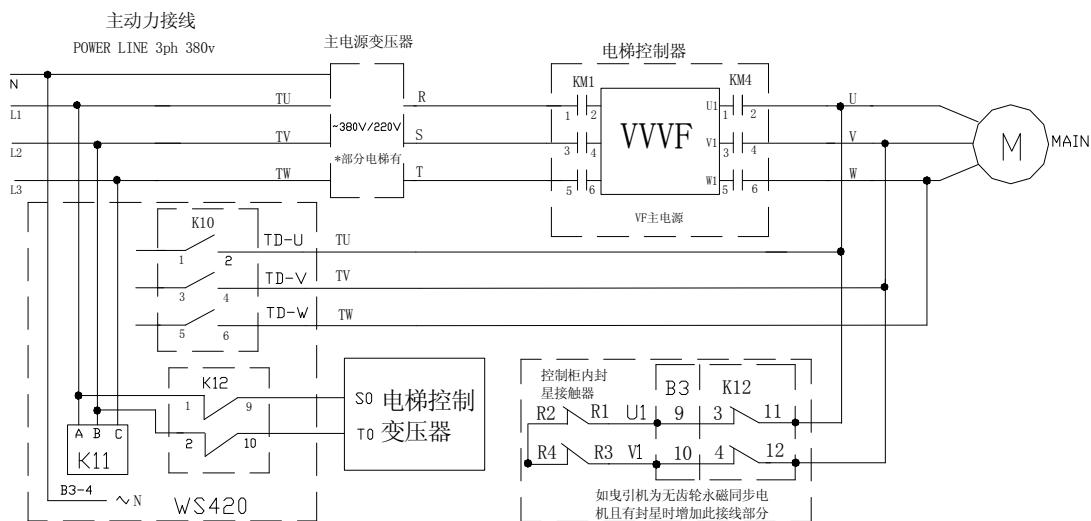
For most elevators, the terminals B3-1, 2, 3, 4 (R, S, T, N) shall be connected to the R, S, T and N terminals of the 3-phase power supply of the elevator's controlling cabinet (Note: Be careful not to connect the zero line N to the

fire line, other wise the equipment will be burnt. See picture 3 and picture 5), and then the ~380V inputting terminal of the elevator's controlling power supply transformer shall be disassembled and connected to the B3-5, 6 terminals of the ARD. That is, make the ARD, the 3-phase AC power supply and the 380V controlling transformer a series connection, and then connect U, V, W terminals of the ARD to the 3-phase output power supply terminals U, V and W between the controlling cabinet and the traction in a parallel connection with 4~6mm² cables. (The wires, backup-traveling cables shall be prepared by the user)

2) Connection of storage battery set

The connection between the ARD's host machine and the storage battery set is prepared at the host machine end. The user needs to take out the connecting cable and connect them to corresponding terminal posts of the battery set separately (see picture 4). The red post is anode and the black one is cathode. (For ARD for elevators without machine room, the connection shall be prepared.)

Installation and Wiring



Picture 3 Connection of power supply

电梯控制变压器: elevator controlling transformer 主动力接线: main power supply connection

主电源变压器: main power supply transformer 电梯控制器: elevator controller

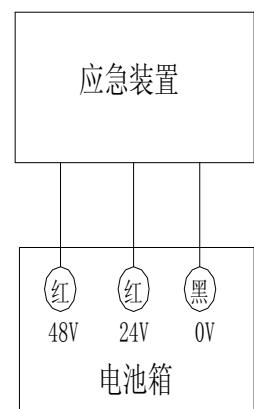
部分电梯有: a part of elevators have 主电源: main power supply

控制柜内封星接触器: 封星 contactor in the controlling cabinet

如曳引机为无齿轮永磁同步电机且有封星时增加的接线部分: this part shall be added if the traction is PM synchronous motor without gear but with 封星

3) Connection to the controlling cable socket B1

B1 is the special cable socket of controlling cables leading to the safety, door lock and overhauling loops in the well hole. Before starting the connection of this portion, the terminals of signal cables in the elevator's controlling cabinet leading to those three loops in the well hole mentioned above shall be found out first. If terminals or terminal posts are prepared by the elevator's manufacturer, then disassemble the original terminals and make marks following the sequence numbers of B1 socket terminals and connection illustration shown in table 2 and table 3. Then use the accessory 12-pin controlling cable



to make connection (see picture 5 and picture 6).

Take the safety loop as an example, the detailed connection shall be like the following: B1-1 and B1-2 shall be connected to the two terminals at the side of the

safety loop in the well hole, and B1-3 and B1-4 shall be connected to the two terminals at the side of the elevator's controlling cabinet. The connection of door lock and overhauling loops are similar to the connection of safety loop. If the elevator manufacturer does not

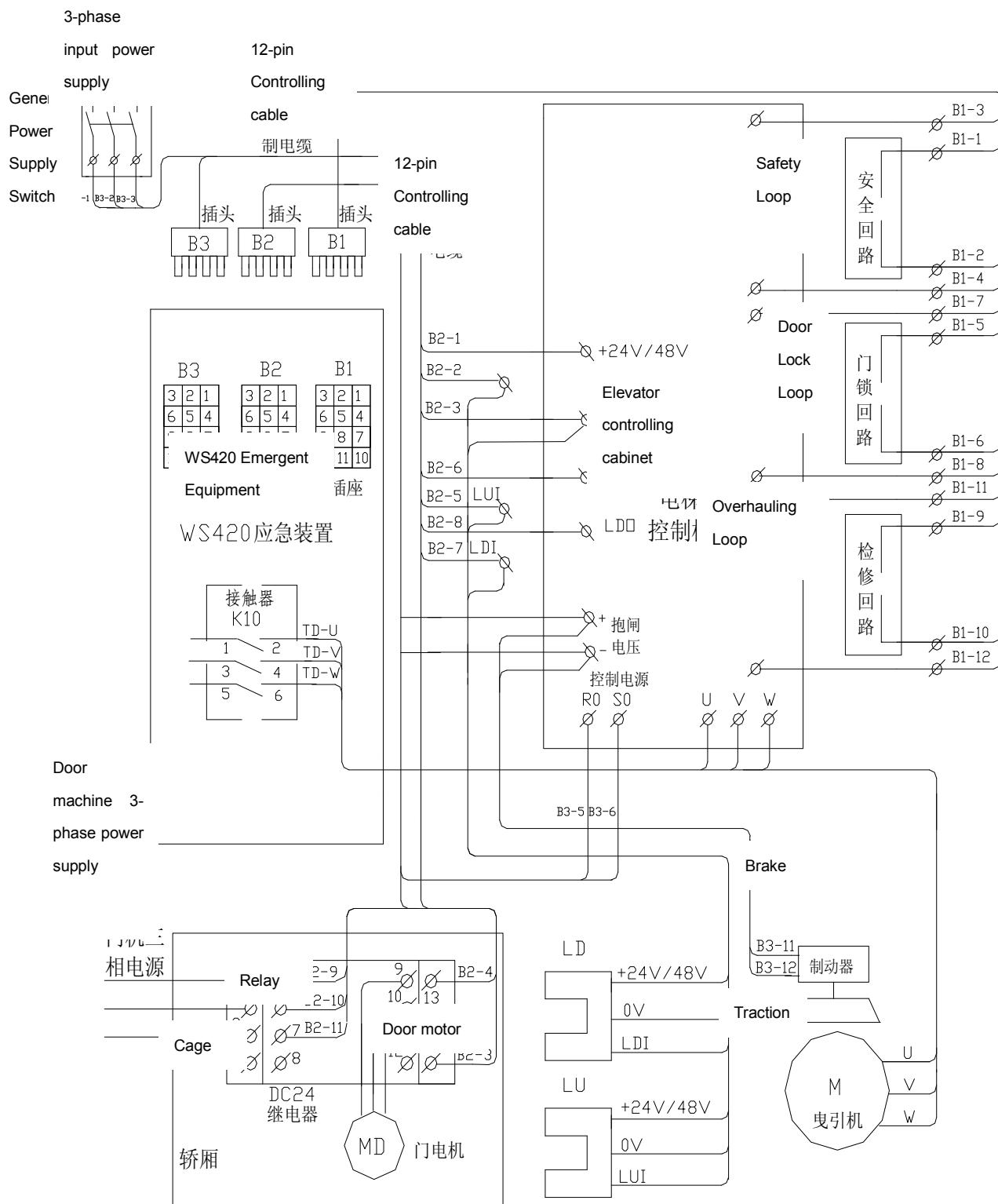
Take the safety loop as an example, the detailed connection shall be like the following: B1-1 and B1-2 shall be connected to the two terminals at the side of the safety loop in the well hole, and B1-3 and B1-4 shall be connected to the two terminals at the side of the elevator's controlling cabinet.

Picture 4 Connection of battery

3	2	1
6	5	4
9	8	7
12	11	10

Table 2 Sequence numbers

The connection of door lock and overhauling loops are similar to the connection of safety loop. If the elevator manufacturer does not prepare the terminals, the six signal cables of those three loops leading to the well hole



Picture 5 General drawing of ARD's connection

接触器 contactor 抱闸电压 brake voltage 控制电源: controlling power supply 插头: plug

Note: If the traction is PM synchronous motor without gear but with 封星, those two lines at the front end of the 封星 contactor in the elevator's controlling cabinet shall be connected to B3-9 and 10 (refer to picture 3 and table 7). Otherwise this equipment will be damaged.

shall be cut off in the controlling cabinet and marks shall be made, and then the connection shall be made separately. After the B1 has been connected, make a mark on the B1 plug and plug it into the B1 socket.

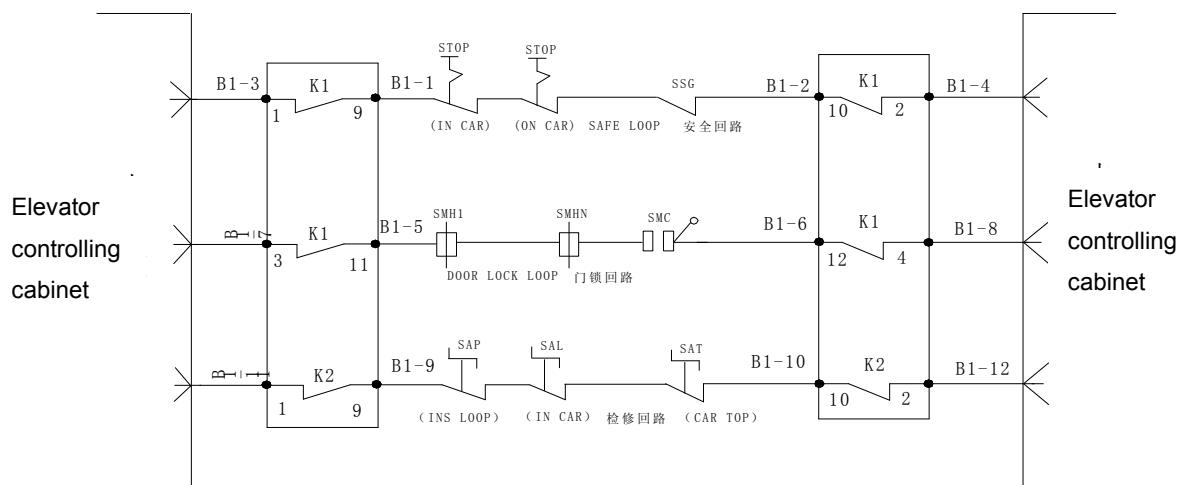
4) Connection to the controlling cable socket B2

B2 is the special cable leading to door area sensor and door machine.

- (1) Please follow the signal definitions and connection illustrations of table 4 (variable frequency door machine), table 5 (DC door machine) or table 6 (AC door machine).

No.	Code	Definition	No.	Code	Definition	No.	Code	Definition
B1-1	SAFI1	Safety loop input	B1-5	DLI1	Door lock loop input	B1-9	INSI1	Overhauling loop input
B1-2	SAFI2		B1-6	DLI2		B1-10	INSI2	
B1-3	SAFO1	Safety loop output	B1-7	DLO1	Door lock loop output	B1-11	INSO1	Overhauling loop output
B1-4	SAFO2		B1-8	DLO2		B1-12	INSO2	

Table 3 Signal definitions of socket B1



Picture 6. Circuit in the well hole

Use B2 cable, disassemble the +24V or 48V line which leads from the controlling cabinet to the door area sensor and connect the line to B2-2, and then connect B2-1 to one end of the controlling cabinet (see picture 5 and picture 7). The B2-3 shall be connected to 0V terminal. Disassemble the upper near floor signal line LU from the terminal, if there is not a terminal, cut off the line here and separate it into LUI and LUO, marks shall also be made. At the controlling cabinet side the LUO shall be connected with B2-6 line, at the well hole side the LUI shall be connected with B2-5. The connection of down near floor is the same like the connection of the upper near floor, at the side of controlling cabinet the LDO is connected with B2-8, and at the well hole side the LDI is connected with B2-7.

(2) The connection from B2 to the door machine will borrow the backup controlling cables from the machine room to the well hole which are leaded to the top of the cage (5 cables to the serial communication door machine, 6 cables to the DC adjustable door machine), and the accessory isolating transforming relay K14 shall

be installed at a proper position on the top of the cage near the door machine.

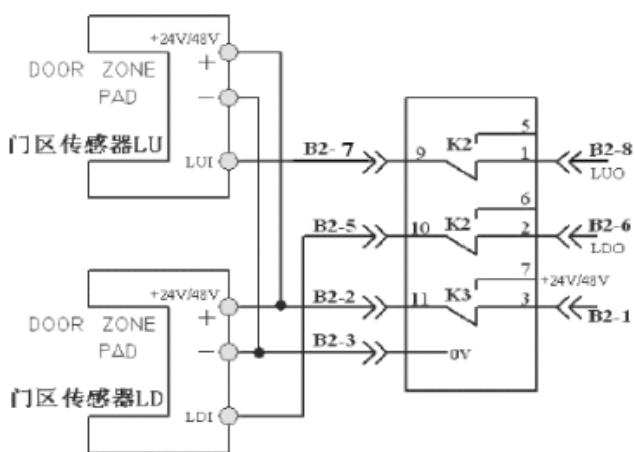
For serial communication door machine or AC 380V door machine, (K14 shall be added), the door driving motor MD 3-phase power supply lines shall be disassembled from the U, V and W terminals on the junction box on the motor side (see picture 8), and connect them to terminal 1, terminal 2 and terminal 3 of K14's normally-closed contacts. Then MD's U, V and W shall be connected to K14's 9, 10 and 11 with wires in the same specification. The lines B2-9, B2-10 and B2-11 from the backup cables are separately connected to terminal 5, 6 and 7 of K14's N.O contacts. B2-4 and B2-3 are separately connected to terminal 13 and terminal 14 on K14's loop. For DC door machine, the line which used to connect to the "+" end of the motor MD's stator winding power supply shall be disassembled, and be connected to No. 3 terminal of K14's normally closed contact. The line used to connect to "-" end shall be disassembled and connected to No. 4 terminal of K14's N.C contact. The "+" end of the stator winding shall be connected to No. 11 terminal of K14, and the "-" end shall be connected to No. 12 terminal of K14. Then disassemble the lines at the "+" end and "-" end of the field winding LM, connect them to terminal 1 and 2 of K14's N.C contact. LM's "+" end is connected to K14's No. 9 terminal, and the "-" end is connected to No. 10 terminal. Lines B2-9 and B2-10 from the backup cables are separately connected to terminal 7 and 8 of K14's normally-opened contact, and B2-10 and B2-11 are separately connected to terminal 5 and 6 of K14's normally-opened contact, B2-4 and 3 are separately connected to terminal 13 and 14 of K14's normally-opened contact.

For frequency variable door machine (see picture 10), the power supply line "L" (fire line) from the controlling cabinet to the door machine's transducer shall be disassembled and be connected to B3-8, and the end at the cabinet shall be connected to B3-7. B2-12 (zero line) shall be connected to the power supply line "N" to the door machine's transducer in parallel, B2-9 shall be connected to the COM end of the door machines open/close door signal line, B2-10 shall be connected to the open door (DO) end of the door machine in parallel, also the B2-11 shall be connected to the close door (DC) end of the door machine in parallel. (If the power supply to the door machine's transducer is at the top of the cage, a relay shall be added at the top of the cage for isolation).

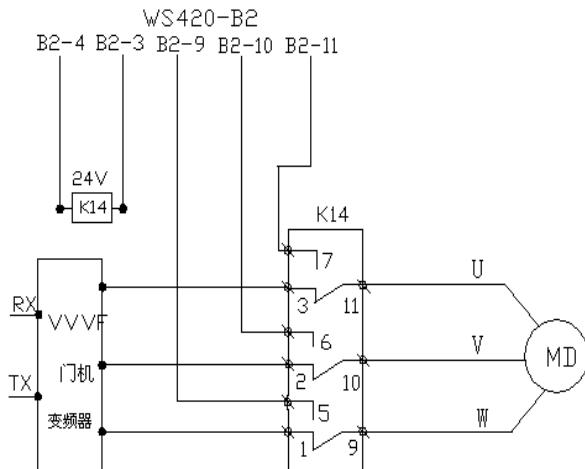
5) Connection to the controlling cable socket B3

B3 is the special cable used for isolating the controlling power supply, the 封星, it is also the cable supplies power for the brake. The third accessory controlling cable is used as B3 (see picture 3, picture 5 and table 7). When making connection the controlling power supply terminals S0 and T0 connecting to the elevator's controlling cabinet shall first be disassemble from the S and T terminals of controlling cabinet's controlling transformer, and connect them to No. 5 line and No. 6 line (R0, S0) of cable B3 which is located at the rear of the ARD, ant the other phase R shall be connected with B3-1, that is, make the ARD and the controlling transformer's AC power supply a series connection. The No. 4 line of B3 shall be connected to the zero line of the input in parallel. Those two 封星 relay lines (U1 and V1) on the traction in the controlling cabinet shall be disassembled and connected to No. 9 and No. 10 terminals of B3 (see picture 4). (Only for synchronous motor with 封星)

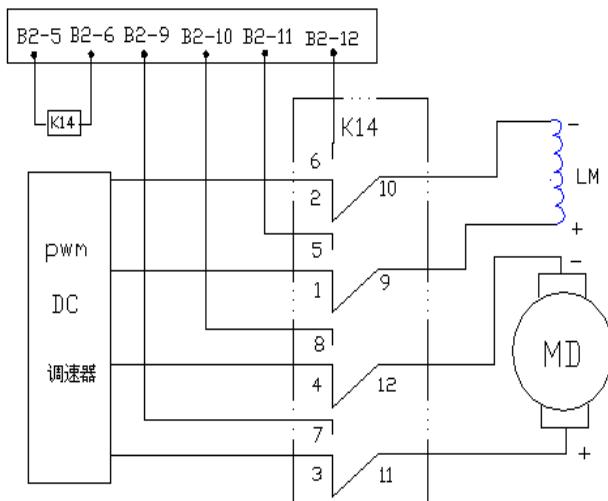
Installation and Wiring



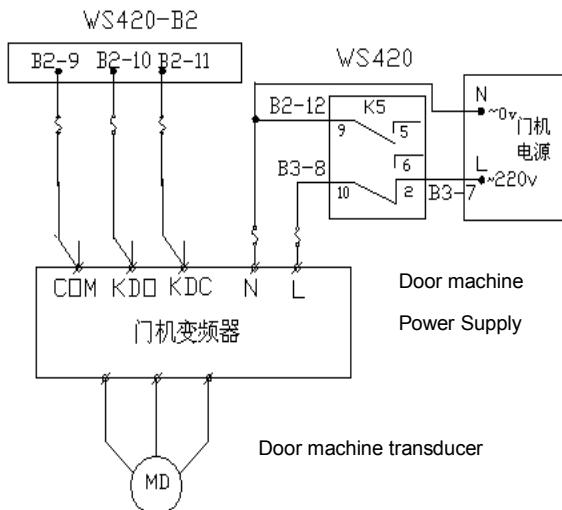
Picture 7. Connection of door area sensor



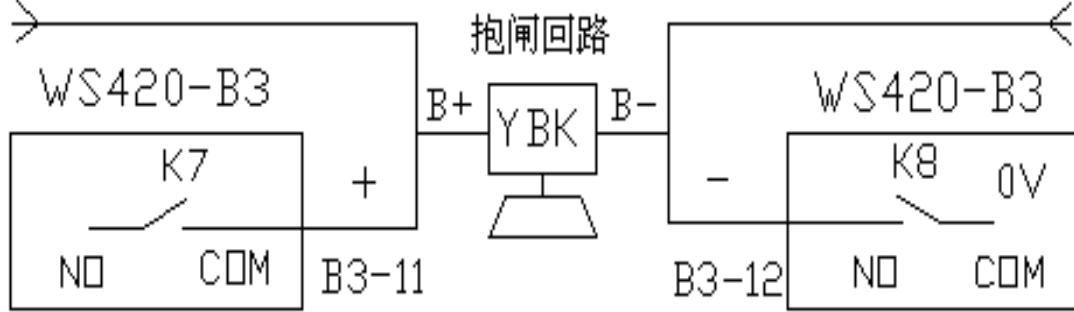
Picture 8. serial communication or AC 380V door machine



Picture 9. Connection of DC door machine



Picture 10. Connection of VVVF door machine



抱闸电压以参数为准
(DC220/DC110/AC220等)

The brake voltage takes the parameter
as criteria (DC 220/DC110/AC220 etc.)

Picture 11 Connection of brake loop

Tabl

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Sign

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No.	Code	Definition	No.	Code	Definition	No.	Code	Definition
B2-1	24VI	24V/48 in	B2-5	LUI	Upper near floor in	B2-9	COM	Open/close door public
B2-2	24VO	24V/48 out	B2-6	LUO	Upper near floor out	B2-10	KDO	Open/close door signal
B2-3	0VO	0V end	B2-7	LDI	Lower near floor in	B2-11	KDC	Close door signal
B2-4	K14+	K14 loop +	B2-8	LDO	Lower near floor out	B2-12	NO	Door machine power supply 0V

of B2 socket (frequency variable door machine)

No.	Code	Definition	No.	Code	Definition	No.	Code	Definition
B2-1	24VI	24V/48V in	B2-5	LUI	Upper near floor in	B2-9	MD+	Door armature +
B2-2	24VO	24V/48V out	B2-6	LUO	Upper near floor out	B2-10	MD-	Door armature -
B2-3	0VO	0V end	B2-7	LDI	Lower near floor in	B2-11	LM+	Door excitation +
B2-4	K14+	K14 loop +	B2-8	LDO	Lower near floor out	B2-12	LM-	Door excitation -

Table 5. Signal definition of B2 socket (DC door machine)

No.	Code	Definition	No.	Code	Definition	No.	Code	Definition
B2-1	24VI	24V/48V in	B2-5	LUI	Upper near floor in	B2-9	Um	Door machine U
B2-2	24VO	24V/48V out	B2-6	LUO	Upper near floor out	B2-10	Vm	Door machine V
B2-3	0VO	0V end	B2-7	LDI	Lower near floor in	B2-11	Wm	Door machine W
B2-4	K14+	K14 loop +	B2-8	LDO	Lower near floor out	B2-12		

Table 6. Signal definition of B2 socket (serial communication or AC380V door machine)

No.	Code	Definition	No.	Code	Definition	No.	Code	Definition
B3-1	RI	Power supply in	B3-5	R0	R0	B3-9	U1	封 星
B3-2	SI	Power supply in	B3-6	S0	S0	B3-10	V1	封 星
B3-3	TI	Power supply in	B3-7	LI	Door power supply in	B3-11	BK+	Brake loop+
B3-4	N	Zero line	B3-8	LO	Door power supply out	B3-12	BK-	Brake loop-

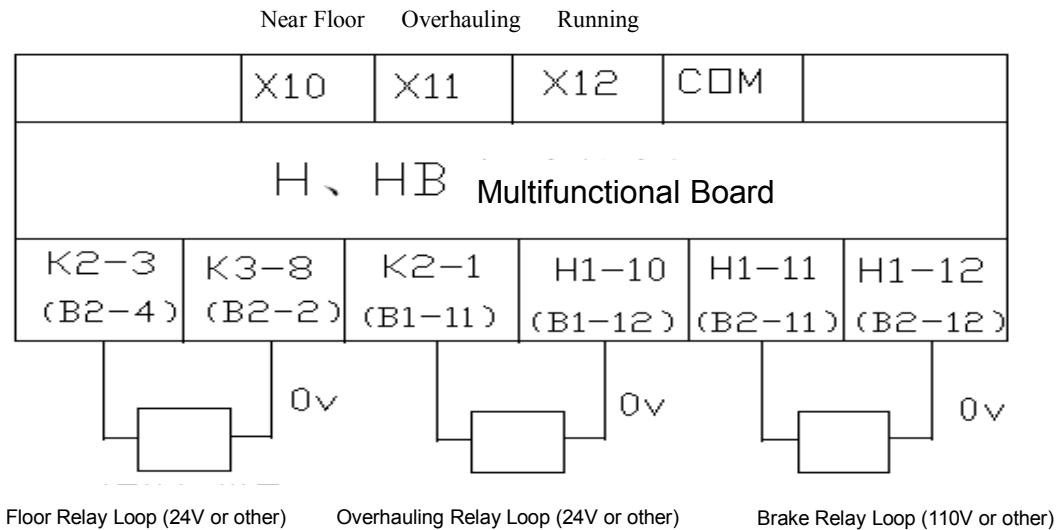
Table 7. Signal definition of B3 socket

5) Connection to the controlling cable socket B3

B3 is the special cable used for isolating the controlling power supply, the 封星, it is also the cable supplies power for the brake. The third accessory controlling cable is used as B3 (see picture 3, picture 5 and table 7). When making connection the controlling power supply terminals S0 and T0 connecting to the elevator's controlling cabinet shall first be disassemble from the S and T terminals of controlling cabinet's controlling transformer, and connect them to No. 5 line and No. 6 line (R0, S0) of cable B3 which is located at the rear of the ARD, ant the other phase R shall be connected with B3-1, that is, make the ARD and the controlling transformer's AC power supply a series connection. The No. 4 line of B3 shall be connected to the zero line of the input in parallel. Those two 封星 relay lines (U1 and V1) on the traction in the controlling cabinet shall be disassembled and connected to No. 9 and No. 10 terminals of B3 (see picture 4). (Only for synchronous motor with 封星)

(2) Connect B3-11 (+) and B3-12 (-) to both ends of the brake in parallel (see picture 11). Note: The anode and cathode of the DC brake cannot be connected reservedly.

(3) For HB smart type, the accessory 3-pin cable plug of the telephone shall be plugged into the HB socket at the rear of the ARD and then insert the telephone line into the telephone. The internal connection of the H or HB series multifunctional board in the ARD shall refer to picture 12.



Picture 12. Internal connection of H or HB series multifunction board

4. Commissioning Procedure

After the ARD is installed and the connection is completed, please strictly follow the following steps to debug.

The code and name of main components in the elevator ARD are listed in table 8:

1) Checking components

Check the inserts, components and terminals to see whether they become loose or even fall off after the transportation. If such problems exist, please fasten those parts with such problems.

No.	Code	Name	No.	Code	Name	No.	Code	Name
1	F1	63A breaker	8	K6	48V power supply relay	15	K13	Open/close door relay
2	F2	4A fuse	9	K7	Brake relay	16	M1	Charger
3	K1	Safety, door lock relay	10	K8	Brake relay	17	M2	DC power supply
4	K2	Overhauling, near floor relay	11	K9	Discharging relay	18	M3	Traction driving board
5	K3	Detecting interface realy	12	K10	Motor contactor	19	M4	PLC
6	K4	Running relay	13	K11	3-phase power supply detecter	20	M5	Door machine board/reversor reverse
7	K5	Door power supply relay	14	K12	Power supply contactor			

Commission Procedure

Table 8 Code and name of main components

2) Checking connection

Please check the connections one by one carefully following the elevator's electric controlling drawing and the drawings provided in this manual, special attention shall be paid. The power supply lines cannot be connected to input/output signal terminals! The B1, B2 and B3 plugs cannot be plugged into wrong place! Otherwise the equipment may be damaged! After all drawings, parameters, logics and connections are confirmed to be correct, please follow the following procedures to debug.

3) Debugging the status of safety, door lock and overhauling loops

Unplug the B1 plug from the ARD; use the resistance grade of the multi-meter to measure the safety loop between cable B1-1 and B1-2. When all switches in the loop are closed, the status of the loop shall be "PASS". If any switch component is cut off, for instance, the cage emergent stop button is pressed down (Note: the emergent stop button on the controlling cabinet is not in the checking loop of the ARD), the status between B1-1 and B2-2 shall be "BROKEN". Use the same method to check the door lock loop between B1-5 and B1-6. When all doors are closed the status shall be "PASS". Open any landing door or car door the status shall be "BROKEN". To check the overhauling loop between B1-9 and B1-10, when there is no overhauling, the status shall be "PASS" (it depends on the overhauling logic level of the elevator, the status may also be "PASS" when there is an overhauling). Press down the overhauling button, the status shall be "BROKEN". After checking the plug shall be plugged into the socket.

4) Check the input signal from the elevator to the ARD

Put the power supply switch on the front panel of ARD to OFF position, the elevator shall be able to operate normally. Otherwise the connections of safety loop, door lock loop and overhauling loop between the elevator and the ARD plug shall be checked to see whether they're correct.

5) Checking the ARD's power supply

Commission Procedure

If the elevator can operate normally, stop the elevator at the near floor position, set ARD, and then put the switch on the front panel of ARD on the “ON” position, thereafter power on the 3-phase AC power supply to check whether the power supply is in normal status. If the power supply is in normal status, the red power supply indicating lamp on the front panel of the ARD is on, and the X1 lamp of PLC is on, after 10 seconds of delay, the Y0 indicating lamp is on, then the following debugging can be made.

6) Checking the logic movement at the near floor position

Shut off the 3-phase AC power supply first, if the landing door and car door are closed, the indicating lamp of PLC's safety loop's signal input point X2, the indicating lamp of PLC's door lock loop's signal input point X3, and the indicating lamp of PLC's overhauling loop's signal input point X4 (all three loops are in the ARD) are all on. And the indicating lamps of PLC's switching output point Y2, detecting output point Y3 and opening door output point Y5 are also on. If the landing door and car door are open, there is no output at Y5 and the lamp is not on. If the near floor sensor is valid for low level (e.g. magnetic switch), the lamp at input point X5 for PLC's door area signal shall be on. (which is not on at standing by) If the near floor sensor is valid for high level (e.g. photoelectric switch), the output of the sensor is 24V, then the PLC's input point X5 shall be shut off and the indicating lamp shall not be on. (the lamp is always on at standing by) For these two scenarios, the green indicating lamp LED on the front panel of the ARD shall be on.

Note: The elevator shall not be at overhauling status; otherwise the ARD will not act. If the work voltage of the near floor sensor is 48V, the 63A breaker shall be closed and the K4 shall be plugged off (when testing non-near floor logic it shall be plugged in), otherwise the near floor will not work.

7) Checking the logic movement at the non-near floor position

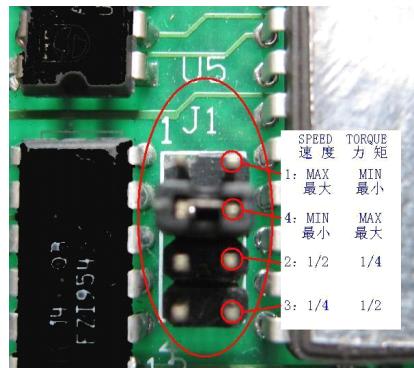
Switch on the 3-phase AC power supply, move the cage to the position with a distance about a half meter from the opening door area by crawling, and resume the overhauling switch to normal position. Then shut off the 3-phase power supply, then the PLC shall make movements as the following sequence: Y2 lamp is on, a switching command is generated; Y3 lamp is on, a testing command is generated; if the input point X2, X3 and X4 are on (“BROKEN” means these lamps shall be on at overhauling, “PASS” means that these lamps shall be off at overhauling), that means the safety, door lock and overhauling loops are normal; Y4 lamp is on, an emergent operation command is generated. The green LED on the front panel of the ARD is on.

8) Setting up the velocity and moment of the ARD

- (1) There is a short circuit insert J1 on the motor driving board in the ARD. As the picture 13 shows. Please notice that generally the moment has been adjusted when the product leaves the factory. Unless an abnormal phenomenon is observed at the working site, please do not adjust the moment at will, in case a moment too small may cause slipping, or too big current may burn the module.
- (2) There are four positions for JMP, as the sequence 1, 2, 3 and 4 marked out in picture 14. The velocity changes from high to low. For 50Hz asynchronous motor, J1 shall be put at the position of 2 or 3; for low frequency synchronous motor, J1 shall be put at the position of 3 or 4. It depends on an even velocity. Picture 13

Adjusting the moment of J1

Commission Procedure



Speed adjuster

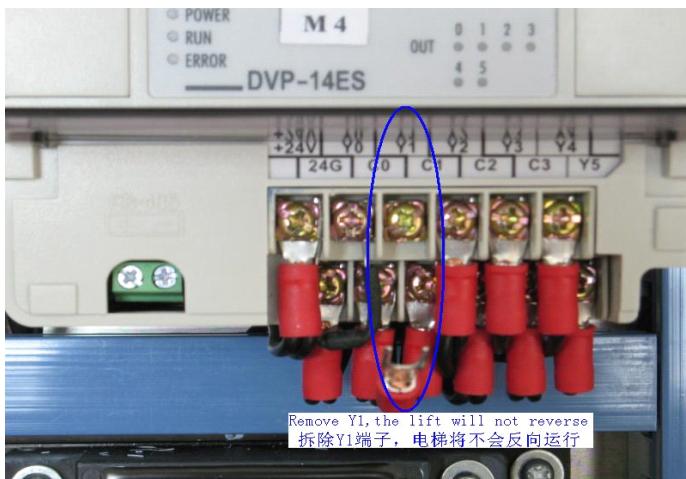
picture 14. JMP J1

9) Debugging emergent operation

Put the switch on the front panel of the ARD at OFF position, close 63A fuse, and disassemble Y1 terminal (see picture 15), turn on the 3-phase power supply. Then put the switch on the front panel of the ARD at ON position, shut off 3-phase power supply, the emergent operation shall be activated, and the elevator shall move upward in a low speed (if the elevator moves downward or does not move, switch the equipment to the reaction's power supply phase order), and the door shall open when the elevator arrives at the door area. If the door does not open, the door motor may be connected at a wrong direction, the polarity (DC) or phase order (AC) of the door motor shall be switched.

10) Directional test

- (1) Repeat procedure 9), if the ARD moves upward with no load normally, the directional test can be made.
- (2) The Y1 terminal on PLC shall still be broken.
- (3) The elevator is with no load (or be loaded with about 40% of its rated load)
- (4) Move the elevator to the upside of the middle floor, with a distance to the opening door area about a half meter.



- (5) Use small screwdriver to adjust the directional pot W1, as the picture 16 shows. **Note do not** adjust the W2!
- (6) Shut off the power supply to do emergent test. When the elevator moves upward, adjust W1 clockwise till the LED L6 is on, and then adjust the W1 anticlockwise till L6 just off.
- (7) Repeat the emergent test, the L6 may flash at the startup but shall be off in the running, and Y1 shall also be off. Then connect Y1 again.
- (8) If conditions are available, load the elevator with 60% of its rated load and do the test. If L6 is on at the startup, PLC's Y1 is also on, there is an output at Y1, and the elevator moves downward at emergent operation, then the equipment is adjusted.
- (9) If the elevator does not move downward, or it still moves forward, or it cannot move, the W1 shall be fine adjusted clockwise till the L6 flashes and there is an output at Y1, also the elevator shall moves downward, then the adjustment is done. (When the elevator moves downward L6 automatically turns off)
- (10) Repeat the 40% loaded or no loaded test to see whether the elevator will move upward in emergent operation. If yes, the adjustment is done; if no, it needs to be fine adjusted.
- If your ARD is H or HB type, please make the following debugging.

11) Electric fault emergent operation debugging

If all above mentioned debugging are normal, switch on the overhauling switch to make the elevator at overhauling status, power on the 3-phase AC power supply, close 63A breaker, move the elevator downward to a position with a distance from the opening door area about a half meter by crawling, set a electric fault manually, and then resume the overhauling switch to normal position. About one minute later, the ARD starts emergent operation and the elevator moves upward (the green lamp on the front panel of the ARD is on), and the door opens automatically when the elevator reaches the opening door area.

12) Wireless call debugging

After the above-mentioned debugging, plug the accessory telephone into telephone line, the 3-pin plug of the telephone shall be inserted into the 3-pin socket on the HB ARD. When the dialing voice is heard in the telephone, dial the cell phone number or telephone number to be called, confirm everything is normal and hang

Input Terminal	X0	X1	X2	X3	X4	X5	X6*	X7	X10	X11	X12
Signal Meaning	Electric Current	Power Off	Safe	Door Lock	Inspection and repair	Door Position 1	Traction	Door Position 2	Leve ling	Inspecti on and repair	Op erat ion
Output Terminal	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7			
Signal Meaning	Power	Direct ion	Switc h	Inspec tion	Operati on	Door-opening	Start	Dial-up			

Table 9 I/O Terminal Signal and Meaning of PLC

Note: Only multi-function type has X10、X11、X12; Only intelligent type has

Maintenance Notice

the telephone, repeat procedure 8. When the elevator starts emergent operation, the telephone can automatically dial the preset number repeatedly, and the cell phone of telephone be called can get ringing signal. After debugging, all components and switches, which have been operated during the debugging process, shall be checked to see whether they are in normal work status. If everything is normal, fix the cover of the ARD and the battery box, and connect a protecting ground line to the shell of the cabinet. The code and meaning of PLC's IO terminals in the ARD are shown in table 9.

5. Maintenance Notice

WS420 ARD is maintenance free, but as a kind of rescue equipment for elevator, we also suggest a routine and regular inspection of the ARD in terms of the following items for safety.

1) Battery Cell Volt Measuring

Check monthly whether the battery cell outputting is in the rated operating voltage. First, turn off the switch which in the front panel of ARD, then cut off the three-phase AC power, and use the direct voltage at multi-meter to measure the output terminal in the back panel of battery. (see Figure 17) the volt of E1, E2 should be more than or equal to 24V, and the deviation between E1 and E2 should be less than 1V. If it doesn't meet the two standards, the battery cell should be changed (useful life of battery is 2-3 year). After measuring, turn on the three-phase AC power, and then turn on the switch of front panel of ARD.

2) Charger Inspection

Inspect the charger of ARD every three months. In normal (state of electrifying) working state of ARD and normal power supply of the three-phase AC power, measure the voltage of E1, E2 with multi-meter. Their volt should be more than 25.5V (at least more than the output (volts), and the deviation between them should be less than 1V. If it meets the two standards, the charger works well.

E2	E1	
○	○	
+48V	+24V	0V

Figure 17. Battery cell

3) ARD Operation Simulation

Simulate an operating of ARD in every six months. Simulation will be done in state of normal power supply of the three-phase AC power. First stop the elevator at half a meter away from the gate region, and put the inspection switch in normal state, then cut off the three-phase AC power. Here the green light of front panel lights, and the elevator door can open automatically when up to the gate region. The simulation ends when green light goes out, again turn on the three-phase AC power, and if the red light lights, the ARD works well.

Note:

When doing the routine inspection, users should turn on the inspection switch, then the ARD will locked and refuse to move. And for the safety of the inspectors, you'd better turn off the switch in the front panel of ARD, (thus, in any case, the ARD will not operate). Remember that, after the maintenance and inspection, you must turn on the switch of ARD.

6. Maintenance Guide

No	Symptom of failure	Examination method	Solution				
1	There is an electric current noise but tractor cannot work, brake operating noise)	a reverse connection between ARD and tractor	exchange the U, V lines of ARD and tractor				
2	There is an electric current noise but tractor cannot work, (no brake operating noise)	1、cut off the band type brake and lines of tractor, and measure B3-11, B2-12, if it has output(volt),(if not, go to step2)	connect a proper resistance which is more than 50W、5-15Ω.				
		2、measure M2, if it hasn't output(volt)(if has, go to step 3),then measure M2, and if its output is 48V,	change M2.				
		3、measure K7, K8 whether it is 110VDC (or 220VDC/AC),	if yes then change to K7 or K8; if not, then change to K4.				
3	door-opening error	frequency conversion door-opener	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">1、if the door-opener reverse (if the engine cannot work, go to step2),</td> <td style="padding: 5px;">exchange the signals of door opening and closing</td> </tr> <tr> <td style="padding: 5px;">2、if B2-9、B2-10 is ~220V</td> <td style="padding: 5px;">1.K14 damage 2, K14 connection error</td> </tr> </table>	1、if the door-opener reverse (if the engine cannot work, go to step2),	exchange the signals of door opening and closing	2、if B2-9、B2-10 is ~220V	1.K14 damage 2, K14 connection error
1、if the door-opener reverse (if the engine cannot work, go to step2),	exchange the signals of door opening and closing						
2、if B2-9、B2-10 is ~220V	1.K14 damage 2, K14 connection error						
direct current door-opener	1、if the door-opener reverse (if the engine cannot work, go to step2)						
	exchange B2-9, B2-10						
	1、if the K14 works (if not, go to step 4), check the output of B2-9、B2-10, if it has(if not, go to step3)						
	normal open and normal close connect reversibly						
	3、if the relay k5 doesn't attract						
	change k5						
	4、check B2-4、B2-3 to see whether it has 24V						
4		serial communication door-opener	1、.if the door-opener reverse (if the engine cannot work, go to step2)				
			exchange B2-8、B2-9				
			2、check whether the relay k5 attracts,				
5	not-leveling	Photo-electricity switch	K14's normal close and common point connect reversibly				
			3、check B2-4、B2-3 to see whether it has 24V				
		Magnetros	leveling logic reverse transform level				
			B2-5、B2-6 (B2-7,B2-8) connected reversibly				
			1、if leveling zone closed occasionally, and continue moving but fail to find the leveling zone				
			exchange B2-2 to B2-3, vice versa				
			2、if leveling zone disconnect occasionally, and continue moving but a relay				
			logic reverse transform with				

			fail to find the leveling zone	
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Package List**7. Package List**

Machine Room Elevator (WS420A)

Fittings, Papers	Unit	G-Series, Basic Type	S-Series, Standard Type	H-Series Multi-Function type	HB-Series, Intelligence type
Mainframe	set	1	1	1	1
battery cell	box	1	1	1	1
Relay and socket*4	set	1	1	1	1
Signal Cable	piece	3	3	3	3
Sound Box	set	--	--	1	1
Telephone set	set	--	--	--	1
User's Guide	copy	1	1	1	1
Matching type“√”					

Machine-free Room Elevator (WS420WJ)

Fittings, Papers	Unit	G-Series, Basic Type	S-Series, Standard Type	H-Series Multi-Function type	HB-Series, Intelligence type
Mainframe	set	1	1	1	1
Accessories	piece	2	2	2	2
Expansion Bolt	piece	5	5	5	5
Relay and socket*4	set	1	1	1	1
Signal cable	piece	3	3	3	3
Sound Box	set	--	--	1	1
Telephone set	set	--	--	--	1
User's Guide	copy	1	1	1	
Matching type√”					

Note: 1. If there is dead zone, quantity of battery cell will increase according to the contract.

2. All of the fittings are loaded in mainframe except battery cell.

3. sign “√” in the relating tables when leaving factory.

4. *not necessary if frequency conversion door-opener

Warranty Card

8. Warranty Card

Dear user:

Our company explains and guarantees the quality of WS420 Elevator ARD as following:

- 1) production and leaving-factory test standard

The produce and delivery standard of the products accord with GB7588-2003 "Safety rules for the construction and installation of electric lifts", ISO9001 : 2002 "Quality Management System and Mode of Production, installation and Service" and standard Q/SGMK-2001 "WS420 electric lifts ARD"

- 2) Warranty Period

Your equipment is guaranteed against any manufacturing defects for one full year from the date of purchase. We are responsible for the quality problems under warranty. On the occasion, please cut the warranty card along the line and send it with the faulty product parts back to our company.

- 3) Exemption of Responsibility

Damage caused by mis-installing, mis-debugging, and misusing which doesn't accord to User's Guide, is not covered by this warranty. And for problems which are not covered in warranty within the warranty period or requests put forward when the warranty has expired, we still handle the business. Material or other relating expense involved will be charged.



Product Type _____ Serial Number _____ Installation Place _____

Symptom of Failure:

User Name: _____ Contact: _____

ng

Address: _____ Post Code: _____

Tel: _____ Fax: _____

Certification

产 品 合 格 证

CERTIFICATION

产品名称 电梯应急装置

ARTICAL Elevator Emergency Power Device

型 号

TYPE **WS420**

出厂编号

SERIAL NO.

根据检查结果符合产品技术标准的要求

THIS APPARATUS HAS BEEN TESTED TO FIND TO BE IN
ACCORDANCE WITH THE TECHNICAL REQUIREMENTS.

检 验 员

INSPECTOR

质 检 部

INSP. DEPT

出 厂 期

DATE OF PRODUCTION

中 华 人 民 共 和 国
THE PEOPLE'S REPUBLIC OF CHINA
上海稳上创新技术有限公司
SHANGHAI WENSHANG INNOVATION TECHNOLOGY CO.,LTD.